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FAMILY LYCEUM.

JOSIAH HOLBROOK, EDITOR.

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From Good's Gallery of Nature and Art.

THE ANCIENTS.

LABYRINTHS.

AMONG the architectural curiosities of antiquity, there are few entitled to more attention than the complicated and extraordinary edifices known by the name of *labyrinths*.—The most celebrated were those of Crete, Lemnos, and Egypt. The first stood near mount Ida, and was the production of the celebrated Dædalus. All we know of it, however, is from loose rumour, or casual reference. Even in Pliny's time not a vestige of it was to be traced; and Bellonius has been so much of an infidel, as to conjecture that it was nothing but an ancient quarry excavated by digging the stones that served to build the neighboring towns of Gortynæ and Grossas.

The labyrinth of Lemnos is supposed by Pliny to have been more magnificent than that of Crete, when both were in their full perfection. It was a vast and splendid pile, supported by forty columns of extraordinary height and circumference. The architects employed in raising it were, Zinilus, Rhodus, and Theodorus, the last a native of the island. In Pliny's time, its vestiges were still to be traced; but Bellonius could not discover a relic of it during his visit to Lemnos.

Of all the labyrinths, however, of antiquity, that of Egypt was the largest and most costly: and it is said to have furnished to Dædalus the model of that of Crete, though he imitated not more than the hundredth part of it. It was so extraordinary, that Herodotus who saw it, says, that it far surpassed the report of fame, being, in his judgment, even more admirable than the pyramids. As there were at least three buildings of this kind, ancient writers, not distinguishing them, generally speak but of one, and consequently with great confusion and disagreement.

They tell us that the labyrinth of Egypt stood in the Heracleotic nome, near the city of Crocodiles, or Arsinoe, a little above the lake Mœris. Pliny places it in the lake, and says it was built by Petesuccus, or Tithoes, one of the demi-gods, four thousand six hundred years before his time; but that Demoteles would have it to be the palace of Motherudes; Lyceas, the sepulchre of Mœris; and others the temple of the Sun. It is recorded by Manetho, that Lachares or Labares, the successor of Sesostris, built a labyrinth for his monument. And Diodorus writes, that Mendes, or Marus, made another for the same purpose, which was not so considerable on account of its magnitude, as for the artificial contrivance of it; but this seems to be a different building from that described by him a little after; which is, in all probability, the same with the labyrinth of Herodotus; for they both agree in the situation. They say it was the work of twelve kings, among whom Egypt was at one time divided; and that they built it at their common charge.

This structure seems to have been designed as a pantheon, or universal temple of all the Egyptian deities, which were separately worshipped in the provinces. It was also the place of the general assembly of the magistracy of the whole nation, for those of all the provinces or nomes met here to feast and sacrifice, and to judge causes of great consequence. For this reason, every nome had a hall or palace appropriated to it; the whole edifice containing, according to Herodotus, twelve; Egypt being then divided into so many kingdoms. But Pliny makes the number of these palaces sixteen, and Strabo, as it seems, twenty-seven. Herodotus tells us, that the halls were vaulted, and had an equal number of doors opposite to one another, six opening to the north, and six to the south, all encompassed with the same wall; that there were three thousand chambers in this edifice, fifteen hundred in the upper part, and as many under-ground; that he viewed every room in the upper part, but was not permitted, by those who kept the palace, to go into the subterraneous part, because the sepulchres of the holy crocodiles, and of the kings who built the labyrinth, were there. He reports, that what he saw seemed to surpass the art of man; so many exits by various passages, and infinite returns, afforded a thousand occasions of wonder. He passed from a spacious hall to a chamber, from thence to a private cabinet; then again into other passages out of the cabinets, and out of the chamber into the more spacious rooms. All the roofs and walls within were incrusted with marble, and adorned with figures in sculpture. The halls were surrounded with pillars of white stone finely polished; and at the angle, where the labyrinth ended, stood the pyramid formerly mentioned, which Strabo asserts to be the sepulchre of the prince who built the labyrinth.

To this description of Herodotus, others add, that it stood in the midst of an immense square, surrounded with buildings at a great distance; that the porch was of Parian marble, and all the other pillars of marble of Syene: that within were the temples of their several deities, and galleries, to which was an ascent of ninety steps, adorned with many columns of porphyry, images of their gods, and statues of their kings, of a colossal size; that the whole edifice consisted of stone, the floors being laid with vast flags, and the roof appearing like a canopy of stone; that the passages met, and crossed each other with such intricacy, that it was impossible for a stranger to find his way, either in or out, without a guide; and that several of the apartments were so contrived, that on opening of the doors, there was heard within a terrible noise of thunder.

We shall subjoin part of the description given by Diodorus of a fabric, which though he does not call it a labyrinth, but a sepulchre, yet appears to be the same we are now speaking of. He says it was of a square form, each side a furlong in length, built of most beautiful stone, the sculpture and other ornaments of which posterity could not exceed; that on passing the outward inclosure, a building presented itself to view, surrounded by an arcade, every side consisting of four hundred pillars; and that it contained the ensigns or memorials of the country of each king; and was, in all respects, a work so sumptuous, and of such vast dimensions, that if the twelve princes who began it had not been dethroned before it was finished, the magnificence of it could never have been surpassed. Whence it seems, that Psammetichus, one of the twelve, who, expelling his associates, made himself master of all Egypt, finished the design, but not with a grandeur answerable to the rest of the structure; though Mela attributes the glory of the whole to that king.

The solidity of this wonderful building was such, that it withstood, for many ages, not only the rage of time, but that of the inhabitants of Heracleopolis, who, worshipping the ichneumon, the mortal enemy of the crocodile, which was the peculiar deity of Arsinoe, bore an irreconcileable hatred to the labyrinth, which served also for a sepulchre to the sacred crocodiles, and therefore they strove to demolish it. Pliny says, it was remaining in his days; and that about five hundred years before Alexander, Circummon, eunuch to king Nectabis, was reported to have bestowed some small reparations on it, supporting the building with beams of acacia, or the Egyptian thorn, boiled in oil, while arches of square stone were erecting.

GREAT WALL OF CHINA.

THE chief remain of ancient art in China, is that stupendous wall, extending across the northern boundary. This work, which is deservedly esteemed among the grandest labors of art, is conducted over the summits of high mountains, some of which rise to the height of 5225 feet, across the deepest vales, over wide rivers by means of arches; and in many parts is doubled or trebled, to command important passes: at the distance of almost every hundred yards, is a tower or massy bastion. The extent is computed at 1500 miles; but in some parts of smaller danger it is not equally strong or complete, and towards the N. W. only a rampart of earth. For the precise height and dimensions of this amazing fortification, the reader is referred to Sir George Staunton's account of his embassy, whence it appears, that near Koopekoo the wall is twenty-five feet in height, and at the top about fifteen feet thick: some of the towers, which are square, are forty-eight feet high, and about forty feet wide. The stone employed in the foundations, angles, &c. is a strong grey granite; but the greatest part consists of bluish bricks, and the mortar is remarkably pure and white.

Sir George Staunton considers the era of this great barrier as absolutely ascertained, and he asserts that it has existed for two thousand years. In this asseveration he seems to have followed Du Halde, who informs us that 'this prodigious work was constructed two hundred and fifteen years before the birth of Christ, by the orders of the first emperor of the family of Tsin, to protect three large provinces from the irruptions of the Tartars.' But in the History of China, contained in his first volume, he ascribes this erection to the second emperor of the dynasty of Tsin, namely, Chi Hoang Ti; and the date immediately preceding the narrative of this construction, is the year 137 before the birth of Christ. Hence suspicions may well arise, not only concerning the epoch of this work, but even with regard to the purity and precision of the Chinese annals in general. Mr. Bell, who resided for some time in China, and whose travels are deservedly esteemed for the accuracy of their intelligence, assures us, that this wall was built about six hundred years ago, (i. e. about the year 1160,) by one of the emperors, to prevent the frequent incursions of the Monguls, whose numerous cavalry used to ravage the provinces, and escape before an army could be assembled to oppose them. Renaudot observes that no oriental geographer, above three hundred years in antiquity, mentions this wall: and it is surprising that it should have escaped Marco Polo; who supposing that he had entered China by a different rout, can hardly be conceived, during his long residence in the north of China, and in the country of the Monguls, to have remained ignorant of so stupendous a work. Amidst these difficulties, perhaps it may be conjectured that similar modes of defence had been adopted in different ages; and that the ancient rude barrier having fell into decay, was replaced, perhaps after the invasion of Zingis, by the present erection, which even from the state of its preservation can scarcely aspire to much antiquity.

ARCHIMEDES AGAIN.

MR. EDITOR—In the interesting account of Archimedes, from 'Good's Gallery of Nature and Art,' in the last number of the Lyceum, is the following sentence:—'And when the Romans thought of sheltering themselves from his pursuit, by keeping at a distance from the haven, *he borrowed fire from heaven*, and aided by his own ingenuity, wrapped them in sudden and inevitable conflagration.'

Now many of your young readers would be utterly at a loss to divine the meaning of this sentence, without supposing that Dr. Good meant to attribute supernatural powers to Archimedes. The allusion is undoubtedly to the celebrated burning-glasses of Archimedes; and perhaps the author is less explicit here, from his entertaining doubts, as many others have, whether the accounts of these powerful glasses were not fabulous. The famous French naturalist, however, BUFFON, has amply vindicated the credit of history upon this point. A short account of his experiments will perhaps be interesting. In 1797, Buffon constructed a machine with 140 plane mirrors, each about 4 inches long, and 3 inches broad. These mirrors were fixed at about 1-4th of an inch distance from each other, upon a wooden frame of about 6 feet square. Each was fitted with movable screws, which were so contrived, that the mirror might be inclined at any angle and in any direction to meet the sun, and thus the solar image of each mirror was made to coincide with it. The experiment was first tried with twenty-four mirrors, and the result encouraged him to proceed. He at last constructed a machine with 400 mirrors, each 6 inches square, mounted on a frame 8 feet high and 7 broad. With 12 of these mirrors combustible matters were kindled at 20 feet. Tin placed at the same distance was melted with 45 of the mirrors, and silver with 117. When the whole machine was employed, all the metals and metallic minerals were melted at 40 feet. Wood was kindled in a clear sky, at the distance of 210 feet. The focus at the distance of 50 feet was 7 inches in diameter; at 240 feet it was 2 feet in diameter. Tin and lead were melted by the whole machine, at the distance of 240 feet—It could be moved so as to burn upwards, downwards, or horizontally; at its most distant focus, or at any nearer interval. Thus we see that the operations of Archimedes upon the Roman fleet, by means of burning-glasses, is not any more to be discredited than the other feats which his knowledge of the laws of matter enabled him to perform, in the defence of his country against her invaders.

It is the part of wisdom to gain knowledge from every source within our reach. One source which has been too little appreciated, is the character and history of the ancients. In some points they evidently surpassed us; and although we cannot expect to equal them in every respect, it is both just and wise that we should resort to them often for wisdom.

From the Young Man's Book of Knowledge.

MAN.

HIS FRAME.

MAN is placed at the head of the animal creation. Animated and enlightened by a ray from the Divinity, he surpasses in dignity every material being. He was made after all other creatures, not only as the most perfect, but as the superintendent and master of all things; created to 'rule over the fish in the sea, and over the fowl of the air, and over cattle, and over the earth, and over every creeping thing.

The body of a well-shaped man ought to be square, the muscles ought to be strongly marked, the contour of the members boldly delineated, and the features of the face well defined. In women, all the parts are more rounded and softer, the features are more delicate, and the complexion brighter. To man belong strength and majesty; gracefulness and beauty are the portion of the other sex. Every thing in both sexes points them out as sovereigns of the earth; even the external appearance of man declares his superiority to other living creatures. His head tends towards the heavens, and in his august countenance beams the sacred ray of sapient reason. He alone sheds the tears which arise from emotions of sensibility, unknown to animals; and he alone expresses the gladness of his soul by laughter. His erect posture and majestic deportment announce his dignity and superiority. He touches the earth only with the extremity of his body; his arms and hands, formed for nobler ends than the correspondent organs of quadrupeds, execute the purposes of his mind, and bring every thing within his reach which can minister to his wants and his pleasures. By his eyes, which reflect the intelligence of thought, and the ardour of sentiment, and which are peculiarly the organs of the soul, are expressed the soft and tender, as well as the violent and tumultuous passions. They are turned, not towards the heavens, but to the horizon, so that he may behold at once the sky which illuminates, and the earth which supports him. Their reach extends to the nearest and most distant objects, and glances from the grains of sand at his feet to the star which shines over his head at an immeasurable distance.

The human body consists of solid and fluid parts, which in general are called the *solids* and *fluids*, or *humours* of the body. The solid parts are *bones*, *cartilages*, *ligaments*, *muscles*, *tendons*, *membranes*, *nerves*, *arteries*, *veins*, *ducts*, or fine tubular vessels of various sorts. Of these simple solids the more compound organs of life consist, viz. the *brain* and *cerebellum*, the *lungs*, the *stomach*, the *liver*, the *spleen*, the *pancreas*, the *kidneys*, the *glands*, the *intestines*, together with the organs of sense, viz. the *eyes*, the *ears*, the *nose*, and the *tongue*.

The fluid parts of the human body are *chyle*, *blood*, *saliva* or *spittle*, *bile*, *milk*, *lympha*, the *pancreatic juice*, *urine*, *phlegm*, *serum*, and the *aqueous humour* of the eyes.

Anatomists have employed much pains in the study of the material part of man, and have assigned to each of the above parts their appropriate use in the economy of his frame; but none, perhaps, have given so comprehensive and eloquent a description of the structure of man, as the late Dr. Hunter.

In order, says this celebrated anatomist, 'to acquire a satisfactory general idea of this subject, let us, in imagination, *make* a man; in other words, let us construct a fabric fit for the residence of an intelligent soul. This soul is to hold a correspondence with all material beings around her; and to that end she must be supplied with organs fitted to receive the different kinds of impressions which they will make. In fact, therefore, we see that she is provided with organs of sense, as we call them: the *eye* is adapted to light, the *ear* to sound, the *nose* to smell, the *mouth* to taste, and the *skin* to touch. Farther, she must be furnished with organs of communication between herself in the brain and those organs, to give her information of all the impressions that are made on them; and she must have organs between herself in the brain and every other part of the body, fitted to convey her commands and influence over the whole. For these purposes, the *nerves* are actually given. They are chords which rise from the brain, the immediate residence of the mind, and disperse themselves in branches through all parts of the body. They are intended to

be occasional monitors against all such impressions as might endanger the well-being of the whole, or of any particular part; and this vindicates the Creator of all things in having actually subjected us to those many disagreeable and painful sensations which we are exposed to from a thousand accidents in life. Moreover, the mind, in this corporeal system, must be endued with the power of moving from place to place, that she may have intercourse with a variety of objects; that she may fly from such as are disagreeable, dangerous, or hurtful, and pursue such as are pleasant and useful to her; and, accordingly, she is supplied with *muscles* and *tendons*, the instruments of motion, which are found in every part of the fabric where motion is necessary: but, to give firmness and shape to the fabric; to keep the softer parts in their proper place; to give fixed points for, and proper direction to, its motions; as well as to protect some of the more important and tender organs from external injuries, there must be some firm prop-work interwoven through the whole; and, in fact, for such purposes the *bones* were given. The prop-work must not be made into one rigid fabric, for that would prevent motion. Therefore, there are a number of bones.* These pieces must all be firmly bound together, to prevent their dislocation; and this end is perfectly answered by the *ligaments*. The extremities of these bony pieces, where they move and rub upon one another, must have smooth and slippery surfaces, of easy motion. This is most happily provided for by the *cartilages*, and mucus of the joints. The interstices of all these parts must be filled up with some soft and ductile matter, which shall keep them in their places, unite them, and at the same time allow them to move a little upon one another; and these purposes are answered by the *cellular membrane*, or adipose substance. There must be an adequate covering over the whole apparatus, both to give it compactness, and to defend it from a thousand injuries; which, in fact, are the very purposes of the *skin*, and other integuments. Lastly, the mind being formed for society and intercourse with beings of her own kind, she must be endued with powers of expressing and communicating her thoughts by some sensible marks or signs, easy to herself, and capable of great variety; and accordingly she is provided with the organs and faculty of *speech*, by which she can throw out signs with amazing facility, and vary them without end.

'Thus we have built a body which seems to be pretty complete; but, as it is the nature of matter to be worked upon and altered, so in a very little time such a living creature must be destroyed, if there is no provision for repairing the injuries which she will commit upop herself, and which she will be exposed to from without. Therefore a treasure of *blood* is actually provided in the heart and vascular system, full of nutritious and healing particles, fluid, and able to penetrate into the minutest parts of the animal; impelled by the *heart*, and conveyed by the *arteries*, it washes every part, builds up what was broken down, and sweeps away the old useless materials. Hence we see the necessity or advantage of the heart and arterial system. What more than enough there was of the blood to repair the present damages of the machine, must not be lost, but should be returned again to the heart; and for this purpose the *veins* are actually provided.—These requisites in the animal explain, *a priori*, the *circulation* of the blood. The old materials, which are become useless, and are swept off by the current of the blood, must be separated and thrown out of the system: therefore the *glands*, the organs of secretion, are given for straining whatever is redundant, vapid, or noxious, from the mass of blood; and, when strained, they are thrown out by *emunctories*, called organs of excretion. But now, as the machine must be constantly wearing, the operations must be carried on without intermission, and the strainers must be always employed: therefore there is actually a perpetual circulation of the blood, and the secretions are always going on. Even all this provision, however, would not be sufficient; for that store of blood would be soon consumed, and the fabric would break down, if there were not a provision made for fresh supplies. These we observe, in fact, are profusely scattered round her in the animal and vegetable kingdoms; and she is furnished with *hands*, the fittest instruments that could have been contrived, for gathering them, and for preparing them in a variety of ways for the mouth.—But these supplies, which we call food, must be considerably changed; they must be converted into blood. Therefore she is provided with *teeth* for cutting and bruising the food, and with a *stomach* for melting it down; in short, with all the organs subservient to digestion. The finer parts of the aliments only can be useful in the constitution: these must be taken up and conveyed into the blood, and the dregs must be thrown off.—With this view, the *intestinal canal* is actually given. It separates the nutritious part, which we call *chyle*, to be conveyed into the blood by the system of the *absorbent vessels*; and the feces pass downward out of the body. Thus we see that, by the very imperfect survey which human reason is able to take of this subject, the animal man must necessarily be complex in his corporeal system, and in its operations; and in taking this general view of what would appear, *a priori*, to be necessary for adapting an animal to the situations of life, we observe, with great satisfaction, that man is accordingly made of such systems, and for such purposes. He has them all; and he has nothing more, except the organs of respiration.—Breathing it seemed difficult to account for *a priori*; we only know it to be a fact essentially necessary to life. Notwithstanding this, when we see all the other parts of the body, and their functions, so well accounted for, and so wisely adapted to their several purposes, there would be no doubt that respiration was so likewise; and, accordingly, the discoveries of Dr. Priestley have lately thrown light upon this function also.

'Of all the different systems in the human body the use and necessity are not more apparent, than the wisdom and contrivance which has been exerted in putting them all into the most compact and convenient form; in disposing them so that they shall mutually receive and give helps from one another; and that all, or many, of the parts shall not only answer their principal end and purpose, but operate successfully and usefully in a variety of secondary ways. If we consider the whole animal machine in this light, and compare it with any in which human art has exerted its utmost skill, (suppose the best constructed ship that ever was built,) we shall be convinced, beyond the possibility of doubt, that there exists intelligence and power far surpassing what human art can boast of. One superiority in the animal machine is peculiarly striking. In machines of human contrivance, or of art, there is no internal power, no principle in the thing itself, by which it can alter and accommodate itself to any injury that it may suffer, or make up any injury that admits of repair: but in the natural machine, or animal body, this is most wonderfully provided for by the internal powers of the machine itself; many of which are not more certain and obvious in their effects, than they are above all human comprehension as to the manner and means of their operation. Thus, a wound heals up of itself; a broken bone is made firm by a callus; a dead part is separated and thrown off; noxious juices are driven out by the emunctories; a redundancy is removed by some spontaneous bleeding; a bleeding naturally stops of itself; and a great loss of blood, from any cause, is in some measure compensated by a contracting power in the muscular system, which accommodates the capacity of the vessel to the quantity contained. The stomach gives information when the supplies have been expended; represents, with great exactness, the quantity and quality of what is wanted in the present state of the machine; and, in proportion as she meets with neglect, rises in her demand, urges her petition in a louder tone, and with more forcible arguments. For its protection, an animal body resists heat and cold in a very wonderful manner, and preserves an equal temperature in a burning and in a freezing atmosphere.—These are powers which mock all human invention of imitation; they are characteristics of the Divine Architect.'

* Dr. Keill reckons 245 bones in the human body; others make them to be 249, viz., in the skull 14, in the face and throat 46, in the trunk 67, in the arms and hands 62, and in the legs and feet 60.

Farmers' Lyceums.

The long evenings which have arrived, present Farmers with an excellent opportunity for intellectual and social improvement. And what place can furnish them with such a rich or abundant source of entertainment and instruction, as the Lyceum? How easy it would be for the farmers of themselves, in nearly every town and village in the Union, to erect a commodious Lyceum, upon the plan represented in the ninth number of our paper; also in the *American Traveller*, who has favored us with an insertion in his columns, of the cut representing a Village Lyceum. Several other papers have promised the same favor; and so far as the importance of the subject is concerned, we should be glad to see it presented and recommended to the readers of every paper in our country.

If every town in the Union were furnished with a place of resort for farmers, and of deposit for the various substances connected with their business, such as soils, minerals and vegetables, with books and apparatus, calculated to assist in the examination of them, what a vast amount of instruction, entertainment, and wealth, would be added to our nation! What could be more useful to this large and respectable part of our nation, than an opportunity to resort once a week to fountains of knowledge, and of mutual and social improvement?

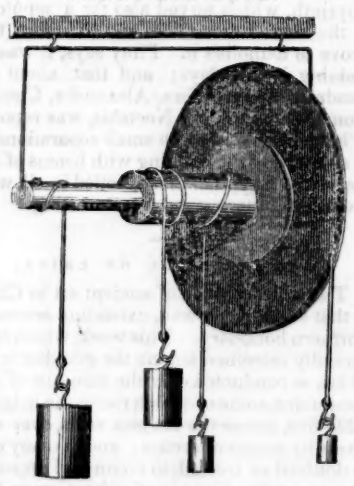
In the hall of the Lyceum, not only farmers, but mechanics, merchants, and all other classes, with their wives and daughters, might meet, and hear a lecture on some general subject, and then divide themselves into several classes according to their ages, or the subjects they might wish to pursue, and occupy the other rooms of the building.—Among the subjects which might be brought up in this way, Agriculture, both as an art and a science, might be rendered one of the most interesting and useful. By the specimens, apparatus, and books, which it would be easy for the Lyceum to provide, the principles of Chemistry, Botany, and Mineralogy, might be studied, in their particular connection with agriculture, in such a way as to be interesting and useful, not merely to farmers, but to persons of every pursuit, and even to ladies.

Besides the laws of chemical science and vegetation, upon which the operations and success of agriculture must depend, the experience of farmers might be communicated to each other, as they were collected in a class-room or a recitation-room of the Lyceum, in a manner which would at once be social and entertaining, and at the same time have an important bearing upon all the operations of the field and the garden. They might, at such a fountain of social instruction, learn to raise more and better wheat, corn, and potatoes, have better oxen, horses, hogs, and sheep, be able to gratify themselves and each other with better fruit, and to enjoy all the blessings designed for their physical nature more fully and richly, while at the same time they would cultivate their immortal parts, and render themselves more worthy of their Creator, by approaching more nearly in resemblance to him.

We do not speak from theory merely; we distinctly recollect many delightful winter evenings thus spent in the society of farmers. We could produce more than one volume of notes taken from the practical remarks, made by practical farmers on many of the most practical subjects, presented as topics of conversation at such social meetings. We look back with delight upon the pleasures of a farmer's life, enlightened, though it might be dimly, by the lamp of science, and enlivened by the active industry and the neighborly acts of those around us. And though deprived at present of a farmer's life and a farmer's pleasures, we respect their character, and would gladly enjoy their society at some comfortable cottage in a country village, and above all, at a Farmers' Lyceum.

APPARATUS.

WHEEL AND AXLE.



In a watch are several wheels and pinions, as they are called, playing into each other. That is, the circumference of one wheel acts, by the means of cogs, upon the axle of another. The axle furnished with cogs is called a pinion. If the wheel has a hundred cogs, and the axle ten, one revolution of the former will give ten revolutions of the latter. If a wheel, connected with the pinion, have a hundred cogs, and play into another pinion with ten, the second pinion will move with ten times the velocity of the first, and with a hundred times that of the first wheel. If a third be added, there will be the increase of a thousand; a fourth, ten thousand, &c. increasing in a tenfold ratio every repetition.

Upon this principle an instrument is made to apply to a carriage wheel, to measure the distance it passes in going from one place to another. Upon the same principle, machines have been made to determine the distance and velocity of a ship's sailing; though the present occasion will not permit our going into a particular description of either instrument.

The wheel and axle represented above, and the wheel and pinion, are, like the pulley, modifications of the lever. The radius or semi-diameter in the wheel constitutes the long arm of the lever, and the semi-diameter of the axle or pinion the short arm.

The wheel and axle, and also the wheel and pinion, may be used to increase power at the expense of velocity, or velocity at the expense of power. If a series of wheels and axles be formed, playing into each other, by going from one end of the series to the other, the velocity will be increased, and in the opposite direction there will be a like increase of power.

In the wheel and axle represented above, the largest diameter is five inches, and the smallest half an inch; the ratio is of course tenfold; and one ounce on the circumference of the wheel will balance ten ounces on the circumference of the axle. Several other propositions may be given, as may be seen by the cut, and shown by the instrument.

As it is our design hereafter to present in our columns a regular treatise on the subject of Natural Philosophy, fully illustrated by cuts, it is neither practicable nor expedient to go minutely even into the description of apparatus on the present occasion. We can hardly refrain from remarking, however, that when it is seen that the lever, the pulley, the wheel and axle, and the wheel and pinion, are all modifications of the same instrument, and that the most simple of which we can conceive, the importance of this instrument, and the ease with which it may be understood, must be acknowledged. Any child of six years old, is wholly competent to understand the nature and the operations of this simple instrument, the lever. And it would do far more to enlarge his mind, and prepare him for business, than many things on which children spend years with little interest or profit. We therefore hope and believe, that the time is not distant when the members, not only of Academies and Lyceums, but of primary schools, will be permitted to enjoy the pleasure and the profit of an acquaintance with these simple elements of knowledge, and these elementary instruments of power.

GEOLOGY.

SIENITE.

The Romans procured a valuable building material from Sienna, a town in Upper Egypt. It was also used in the pyramids and the other monuments in Africa, which are the wonder of the modern world.

A rock, resembling that which is so famous in antiquity, is deposited in exhaustless abundance in the vicinity of Boston. To it that city owes some of its wealth and much of its beauty. At present it is more commonly and more extensively used than any other material.

In Quincy and Braintree are deposits of this rock in sufficient quantities to build an hundred cities like Boston. The citizens of New York, New Orleans, and some other cities, have already availed themselves of these deposits for constructing durable and beautiful buildings.

In the western parts of England, and in Ireland, is the same kind of rock.

The rock here referred to, is composed of two and sometimes of three ingredients. These ingredients are the simple minerals already described in the previous numbers of the Lyceum. Mica is not one of them. Quartz is not essential. Felspar is the most abundant, and hornblende is always a component part. It is perhaps more commonly composed of felspar, quartz, and hornblende.

The rock composed of these three ingredients is called Sienite, from the name of the Egyptian city which furnished it for the building of Rome, as well as the pyramids, labyrinths, and other monuments of that still more ancient country.

Sienite is one of the most intimate associates of granite: it is even sometimes called granite. The distinction between the two rocks is, that one contains mica, and the other hornblende, combined with felspar and quartz. Sienite, which contains hornblende in place of the mica, is the hardest and heaviest rock, and is the less liable of the two to be defaced by time. In the quarries in Sienna, which were wrought by the Romans more than two thousand years ago, the chisel marks are as distinct as if they had been made within a year.

GREENSTONE.

Large deposits of rock, on both hemispheres, contain hornblende in greater abundance than sienite. Such are most of the rocks in the vicinity of Boston. Such are Mount Holyoke and Mount Tom, which open a passage for the Connecticut river near Northampton. Such are east and west rock, which add so much to the beautiful scenery of New Haven. Such are the rocky masses which form the foundation stone and building material of Edinburgh. Of the Giant's Causeway hornblende forms a considerable part. Into soils it sometimes enters, though not to increase their fertility.

The rock of which hornblende forms the largest part, is frequently called greenstone, sometimes trap rocks, the lines between which and basalt are perhaps not very distinctly drawn or fully settled.

BASALT.

The question has been considerably agitated, whether the rocks which compose Mount Holyoke, Mount Tom, Nahant, East and West rock, &c. are basalt. Indeed, as has just been remarked, the lines which separate the different hornblende rocks are not well defined.

What is the most remarkable circumstance, perhaps, respecting the Giant's Causeway, which is considered by all geologists as basalt, is the numerous columns which rise to a stupendous height, with as much regularity as if they were the work of a mason. A singular circumstance respecting these pillars, is the numerous blocks of which they are composed, from one to two feet in length, varying still more in their diameter. These blocks are generally concave at one end and convex at the other, each exactly fitting the end of the adjoining block. These blocks are three, four, or six sided prisms, with such sides as exactly fit each other, the whole making one solid mass of mason work.

The pillars which compose the precipices at New Haven and the mountains just mentioned, frequently rise with great regularity, presenting no mean resemblance of that far-famed curiosity in the northeast of Ireland.

Sienite, trap rocks, greenstone and basalt form so large a part of the rocky masses of our earths, and are so connected with Geography and other branches of a useful education, that no man, woman, or child, ought to be satisfied until they are able to recognize them as they constantly meet their eye in ledges, buildings, walls, and by the wayside.

SULPHURETS AND SULPHATES.

Not long since, we received a box of the sulpharet of iron, from Strafford, Vt. This ore of iron is deposited in that and the neighboring towns in great abundance, and applied to useful purposes. Its use in the arts is not to make iron, but copperas.

This mineral, which is composed of sulphur and iron, has been mistaken by thousands for gold. This mistake has in an instant accumulated thousands of fortunes, and dissipated them as soon. How could any one doubt that he had fallen upon an independent fortune, when he had discovered, as he supposed, a deposit of gold by the ton, and by the hundred of tons? And how could he fail of being rather chap-fallen upon the second discovery, that his exhaustless mine of gold was an almost useless mass of sulphur and iron.

Although no philosopher's stone has been found capable of changing this mineral, which often presents the color and lustre of gold, and in beautiful cubical chrystals, into that precious metal, the process of changing it into a substance almost essential in the arts, especially in dying, is easy and almost spontaneous.

In Strafford and several other places in this country, where copperas is manufactured, vast piles of the sulphuret of iron are formed, which, by the action of the oxigen in the atmosphere upon the sulphur in the mineral, undergo a spontaneous combustion. By this process of combustion, or the combination of oxigen and sulphur, sulphuric or sulphurous acid is formed. This acid, uniting with the iron, first changing it into an oxide and then into a salt, results in the substance known in the arts by the name of copperas, sometimes green vitriol, and in chemistry by that of the sulphate of iron.

By this change, the difference between sulphurets and sulphates must be evident. It will be seen in a moment that the sulphuret of iron is sulphur and iron; and that the sulphate of iron is sulphuric acid and iron; that two elements compose the one, and those two, with oxigen added, form the other.

The same principles, in the nomenclature of chemistry, are applied to all other substances. We hence have the sulphuret of lime, and the sulphate of lime; the phosphoret of lime, and the phosphate of lime; the sulphuret of copper, and the sulphate of copper; the sulphuret of zink, and the sulphate of zink; carburetted hydrogen, and carbonated hydrogen, &c.

We have several objects in view in presenting this subject to the attention of our readers. One object is to present to them the language of science, that they may see its advantage over the common terms. The acid which is formed, and is active in their chemical and spontaneous manufacture, is, in common language, called oil of vitriol: in chemistry, sulphuric acid—the one vague, the other definite—the one descriptive, the other, perhaps, liable to mislead from the constituent ingredients.

The useful article which is the result of this manufacture, is, in common language, called copperas; in chemistry, sulphate of iron. In which terms the one has the same preference to the other, as in the other case just mentioned.

Another object we had in view in calling up this subject, was to present the advantages of science, especially of geology and chemistry, to the prosperity and the wealth of our country. But a few years since, all the copperas used in America was brought from Europe. Since geology has discovered that valuable deposit in Strafford, and chemistry directed to its application, our whole country is supplied with copperas of a better quality, and at a cheaper rate, from our own hills and ledges, than it can be procured from other countries.

We also wished to acquaint our readers, so far as they are not already informed, of the abundance, nature and uses of this mineral deposit, in hopes that it might lead a few of them, at least, to look and examine for themselves, not for the sulphuret, or other ores of iron, merely, but for all other substances which our Creator has put within our understanding and our use.

We will merely add, that if the pupils in the schools of Strafford will forward to us a box of the sulphuret of iron, and those of the schools in Baltimore forward a box of magnesite, or the mineral from which Epsom salts are made, we will be the medium of exchange between the schools of a southern city and a northern country village, and acknowledge a valuable favor from the one and the other.

From Mitchell's Cyclopædia.

PEARLS.

The pearl is a concretion found in several species of shells, as in some species of the oyster and the muscle. Pearls are of a silvery or blueish white color, and very brilliant. They are formed of the same matter as the inner shell of the fish to which they belong, and consist of several coats spread with the greatest regularity over each other in a manner similar to those of an onion.—The most important fishery to England at present, is that of Ceylon. There are various methods of fishing for pearls in different parts of the world, but the Ceylon fishery is reckoned superior to them all.

Mother of Pearl, is the shell, not of the pearl oyster, but of another sea-fish of the oyster kind. This shell on the inside is extremely smooth, and of the whiteness and water of pearl itself; and it has the same lustre on the outside, after the first laminæ or scales have been cleared off.

Artificial Pearls. As the genuine pearls are sold at an extravagant price, various methods have been contrived of imitating them so completely, that they can scarcely be distinguished from those collected in the East. The principal ingredient employed for this purpose consists of the fine silvery matter which is found on the lower side of the scales of the blay, or bleak fish, (*Cyprimus alburnus.*) These scales are first removed; then washed repeatedly in pure water; and, after the different liquors have subsided, the fluid part is carefully decanted; when a pearly matter, of an oily consistence, remains at the bottom; which is denominated by the French, *Essence d'Orient.* A small portion of this matter is dropped in a hollow, blueish glass bead, that is gently agitated, till the whole internal surface is completely lined; when the cavity is filled up with wax, in order to impart solidity and weight. Pearls thus manufactured, possess fewer blemishes than such as are natural or genuine, to which they are fully equal in point of brilliancy.

GASTRIC JUICE,

A fluid of the utmost importance in the process of digestion. It does not act indiscriminately on all substances, nor is it the same in all animals, nor does it continue always of the same nature, even in the same animal; it changes according to circumstances. It acts with a chemical energy in dissolving food: it attacks the surface of bodies, unites to the particles of them, which it carries off, and cannot be separated from them by filtration. It operates with more energy and rapidity the more the food is divided, and its action is increased by a warm temperature. The food is not merely reduced to very minute parts; its taste and smell are quite changed; its sensible properties are destroyed, and it acquires new and very different ones. This fluid does not act as a ferment, it is a powerful antiseptic, and even restores flesh already putrified.

SCHOOL AGENT SOCIETY.

Mr. Jewett, the Recording Secretary of the School Agent Society, has recently visited about forty towns in five counties in Connecticut, where he has given lectures upon the subject of education. The results of these lectures, from various accounts, are truly happy and even astonishing.

The efforts of Mr. J. together with those of Mr. Hall, and his assistants in the Teachers' Seminary, and of other agents, furnish all the proof that can be desired, that if the society pursues vigorously the objects and the plan it has proposed, it may effect a complete intellectual and moral revolution in our country.

As the society stands entirely aloof from every thing sectarian either in religion or politics, and has for its simple and sole object the *advancement of education*, all denominations and classes readily and heartily engage in its exercise, as the sure and only way of sharing its benefits. It does not propose to educate the children of our Republic by an annual course of lectures, or by the appointment of presidents and vice-presidents; but by furnishing these children with the means, aided by their parents, of educating themselves. Instead of depending upon a course of lectures given once a year, from fifty to a thousand miles from them, they are provided with the means of meeting once a week for instructing each other, and for carrying instruction to their firesides and tables.

FEMALE SEMINARIES.

In our last we mentioned the Savannah Female Seminary as setting a good example for similar institutions throughout our country. We might also have mentioned another, near Milledgeville, in the same State, in a highly prosperous condition. It is in charge of Dr. R. C. Brown, and contains over a hundred pupils, collected from various parts of Georgia and the other Southern States, who are called there by the enlightened and liberal course of instruction and management pursued by the principal.

Few if any seminaries at the north have introduced more of the modern improvements which Dr. B. has collected both from this country and from Europe.

We might mention other Female Seminaries at the south, which from personal knowledge we know to be conducted upon the most enlightened principles of education, because they are upon the principles of mind and heart.

CO-OPERATION OF SCHOOLS.

Whether we consider the power which would exist in a system of co-operation among schools of various grades, in all parts of the American Union, or the ease with which it might be brought into exercise, it is one of the most beautiful subjects which can be presented to the friends of education and to all liberal minds. If the members of schools in a few of our principal cities, should proceed upon an interchange of kind offices, by a system of exchange in specimens of Natural History, and by meteorological tables, which they might keep and communicate to each other, the schools in all country villages would readily and gladly lend their aid in forwarding an enterprise in which they would have peculiar advantages to engage.

A good beginning is already made in this intellectual and national object, by school lyceums, or associations for mutual improvement among the pupils of numerous schools in various sections of the country. Some of these school lyceums have already collected large cabinets of natural and artificial productions, and of *common things*, which, to a considerable extent, they have already exchanged with each other.

As the legislatures of most of the States will convene during the approaching winter, a good opportunity will be presented for the school lyceums which are or may be formed, to make a *good beginning* in forming State Cabinets of Natural History, which could not fail to advance the diffusion of knowledge and the practical arts.

AMERICAN CUTLERY.

The pen which we have this moment taken up, furnishes a pleasant proof of the progress of the American arts. It was made by a neat and beautiful knife presented to us by Mr. Jonathan Robinson, of Canton, (Mass.) where he manufactures penknives, surgical instruments, and other finished articles of cutlery, to the amount of ten or twelve thousand dollars annually.

In point of neatness and taste, and, so far as we could judge, in excellence, the various specimens he presented on two or three cards, are equal, if not superior to any we have witnessed from the English manufactories.

Such results of American industry, and especially the American skill which produced them, must upon every principle of political economy, be considered as American wealth.

CIRCUIT SCHOOLS.

The general interest excited in all parts of the country, on a system of itineracy, or circuit teaching by the School Agent Society, acting in concert with Lyceums, is in the highest degree gratifying. The Corresponding Secretary of that Society has received communications from nearly every State in the Union on this subject; some from those who wish to engage as Lyceum Professors or Circuit Teachers, and others from those who wished to procure their instruction.

Numerous individuals are making preparations to engage in this Lyceum enterprise in the western valley, and to engage under the direction of the Society, in such a way that they can strengthen each other's hand in this great and good work.

It is believed that fifty or a hundred will start together on this plan early in April next, or possibly in March.

BOSTON PRIMARY SCHOOLS.

Dr. Spurzheim gave a most perfect statement of the Boston Primary Schools, when, in speaking of *ideas* and the *signs* of ideas in a lecture, he remarked that our schools appeared to be almost entirely devoted to the latter.

APPRENTICES' LIBRARY ASSOCIATION.

The Apprentices of Boston, who have a large Library, have adopted the only practical or rational plan for effecting the object of their society. That is, *self and mutual improvement.* Under that plan, Mr. Weeks, one of the members, gave a lecture on Tuesday evening last, on the Mechanical Powers.

Several of the members have taken up the subject of Geometry, and several others Chemistry; on which subjects they design first to inform themselves, and then their associates.

By such a course they will realize, in the highest degree, the value of their Library, and prevent it, like most Apprentices' and Social Libraries, from lying useless upon their shelves.

THE PIOUS COUNTERFEITERS.

A couple of booksellers, but a little more than forty miles in the interior, who were noted for their long prayers and demure faces, employed a mechanic not long since to counterfeit the School Apparatus, which they offered for sale under the name of 'Holbrook's Apparatus.' By offering it at a reduced price, they imposed upon a few individuals in their vicinity, by selling them sets, and put a quantity of it up at auction in New-York, and one or two of the neighboring cities, which is now thrown away as rubbish by those who purchased it. They however convinced their correspondents of what they did not doubt before, viz. that neither noise nor long prayers are religion; and by their own losses they were again taught the lesson which they had found it so difficult to learn—that *honesty is the best policy.*

AN IGNORANT IMPOSTOR.

We are informed that a man, whom we have had occasion to know, as being *grossly ignorant*, and not acquainted with the first principles of any science, and as destitute of the confidence of every one who knows him, has made several attempts to impose upon individuals in this city, by pretending that he could furnish them with Scientific Apparatus, and thus induce them to aid him in imposing upon the public.

TITLES OF HONOR.

No more formidable obstacles can be thrown in the way of the general diffusion of Knowledge and Self-Education, than *Honorable Names.* Instances are thick all over our country, where the efforts of those who were depending upon labor, and wishing to labor for their own improvement, have been completely paralysed, by committing the measures they were pursuing to the hands of those who fancied that their *names* were sufficient to give all the children of our Republic a knowledge of reading, writing, and all the sciences, without the drudgery of hard study.

MORAL PHILOSOPHY.

The fifth chapter of Matthew probably contains more sound philosophy than any other writing in any language of the same amount.

OLD PROVERBS.

To do good and to be good, is to be happy.
It is more blessed to give than to receive.
The way of transgressors is hard.
The merciful shall obtain mercy.
He that giveth to the poor, lendeth to the Lord.
He that casts his bread upon the water, shall find after many days.
The liberal soul shall be made fat.
He that watereth shall also be watered himself.
A wise man is strong, and by knowledge he increases in strength.

THE ARTS.

[Concluded from our last.]

PORCELAIN.

THE investigations of Reaumur, already detailed, make it evident that the characteristics of porcelain, as far as they depend upon semi-vitrification, may be obtained when ingredients wholly fusible are employed, provided the fire be carefully withdrawn from the oven at the precise moment when vitrification has arrived at, and not proceeded beyond, a certain point. Accordingly, this porcelain was, in one time, very commonly produced both in this and other countries. The quality of goods thus composed is always inferior to that of true porcelain; and if further or again exposed to the heat of the furnace, the substance would entirely change its nature, and run into a vitreous and shapeless mass.

Porcelain of this description, much esteemed for its beauty, was long manufactured at Bow and at Chelsea. It was not until the year 1768, that Mr. Cookworthy discovered certain mineral substances in Cornwall similar in their properties to the porcelain earths of China; and having secured to himself, by patent, the exclusive right of using those materials, was the first person who made true porcelain in England.

In practising this art, Mr. Cookworthy, and those to whom he afterwards assigned his patent right, attained to considerable success as regarded the quality of their manufactures, although the demand for their goods did not prove proportionate to the money expended in bringing the processes to perfection. One probable cause for the inadequacy of their remuneration, existed in the successful efforts of Mr. Wedgwood, which have been already detailed, for improving the quality of common earthen wares made in Staffordshire, whereby foreign porcelain was rendered less an object of desire, and consequently its successful imitation was no longer considered as being of any great importance.

The extent to which, in the year 1785, this manufacture had arrived, and its importance to the three great interests of the country, landed, maratime, and commercial, may be collected from the evidence then given by Mr. Wedgwood before a committee of the privy council, and at the bars of the two houses of parliament. The question at that time under the consideration of the legislature, and upon which these examinations were taken, arose out of the proposal of government to abolish the system of commercial restrictions and disabilities then existing between Great Britain and Ireland, and to render the intercourse between the two divisions of the empire nearly as free and unrestricted as that between the counties of Durham and Northumberland; a proposition so perfectly natural and reasonable in itself, that, but for the possession of records wherein they have been preserved, we might really be at a loss to conjecture the nature of the arguments whereby it was opposed and defeated.

In the course of the discussions to which this subject gave rise in the house of lords, the marquis of Lansdowne, remarking upon the evidence given by the respectable merchants and manufacturers at the bar of the house, declared, that the result to which he in his own mind had arrived, was the very opposite to the conviction which they had adopted. 'Though much valuable information may,' said his lordship, 'doubtless, be derived from their evidence, it must not be forgotten that they are men peculiarly subject to prejudice and error, in all cases where their personal interests are concerned. Were any one, for instance, to ask a manufacturer at Halifax, what is the greatest crime upon earth? Is it felony, is it murder, is it parricide? No! he would answer; it is none of these: It is the exporting of WOOL.'

In later times, we have seen this measure of justice and sound policy more successfully brought forward; and it is acknowledged that each country has since been reaping benefits in consequence, upon the inevitable arrival of which nothing but the strongest commercial prejudices and national jealousy could have thrown even a momentary doubt.

Mr. Wedgwood, in the course of the evidence already alluded to, thus remarks: 'Though the manufacturing part alone in the Potteries and their immediate vicinity, gives bread to 15 or 20,000 people, yet this is but a small object when compared with the many others which depend on it; namely, 1st. The immense quantity of inland carriage it creates throughout the kingdom, both for its raw materials and finished goods. 2d. The great number of people employed in the extensive collieries for its use. 3d. The still greater number employed in raising and preparing its raw materials in several distant parts of England, from near the Land's End, in Cornwall, one way along different parts of the coast, to Falmouth, Teignmouth, Exeter, Pool, Gravesend, and the Norfolk coast; the other way to Biddeford, Wales, and the Irish coast. 4th. The coasting vessels, which, after having been employed at the proper season in the Newfoundland fishery, carry these materials coastwise to Liverpool and Hull, to the amount of more than 20,000 tons yearly; and at times when, without this employment, they would be laid up idle in the harbor. 5th. The further conveyance of these materials from those ports, by river and canal navigation to the Potteries, situated in one of the most inland parts of this kingdom; and 6th, The reconveyance of the finished goods to the different parts of this island, where they are shipped for every foreign market that is open to the earthen wares of England.'

Mr. Wedgwood very justly observed further, that this manufacture is attended with some circumstances of advantage which are almost peculiar to itself; viz that the value of the finished goods consists almost wholly in the labor bestowed upon them; that every ton of raw materials produces several tons of merchandize for shipping, the freight being paid, not upon the weight but according to the bulk; that scarcely a vessel leaves any of our ports whose lading is not in part made up of these cheap, bulky, and, for these reasons, valuable articles to this maratime country; and that fully five parts in six of the aggregate manufactures of the Potteries are exported to foreign markets.

Important as were the advances which at that time had been made in the art, Mr. Wedgwood was still of opinion that they could be considered but as the beginning of improvements, that these were still but in their infancy, and but of little moment when compared with those to which the art was capable of attaining, through the continued industry and growing intelligence of the manufacturers, in combination with and fostered by the natural facilities and political advantages enjoyed by the country; an opinion fully borne out by the event, and which our progressive experience shows to have been founded on clear and accurate perceptions.

The manufacture of earthen wares in England is far from being restricted to the district in Staffordshire which has been described already as having acquired the name of 'the Potteries.' Establishments for making the commoner kinds of wares are to be found in many and various parts of the kingdom; at Lambeth, especially, several manufactories of stone pottery have been carried on for considerably more than a century, producing articles which have never been surpassed in any country, either for the excellence of their materials and workmanship, or for the magnitude of the vessels and the variety of uses to which they are adapted. The Lambeth ware may, in fact, be pronounced perfect of its kind.

Porcelain has long been made at Derby, and at Coalport, near Colebrook Dale, in Shropshire. Establishments have subsequently risen in the city of Worcester, wherein very beautiful specimens are produced; and yet more recently the manufacture of excellent porcelain has been engrafted upon a long-established pottery for common wares, situated at Swinton, near Rotherham, in Yorkshire. At the Rockingham works, which have been so named in compliment to their early patron, the celebrated marquis of Rockingham, porcelain is now produced which vies successfully, in every kind of excellence, with that of older English establishments. Among many other specimens, which attest the proficiency of the Yorkshire manufacturers, two may be more particularly mentioned, which are deserving of more than common attention as denoting the degree of advancement to which the art has reached in England.

One of these pieces is a copy in enamel colors, made on a porcelain tablet, from an original painting by Vandyke, and now in the possession of the noble inhabitant of Wentworth Castle. The subject of the picture is, 'The earl of Strafford occupied in dictating his defence to his secretary.' The execution of this copy does justice to the masterly original; and, in regard to expression and coloring, has been pronounced equal to the most admired productions of the Sevres works. The other specimen is remarkable, not only for elegance of design, and the goodness of the workmanship, but also because it is believed to be the largest piece of porcelain that has hitherto been made in this country. It is a scent-jar, forty-four inches high, made and fired in one entire piece. The base or plinth is triangular, having a circular projection at each angle; from these rise lion's paws, upon which the globular body of the jar is supported. The scent is allowed to escape through hexagonal openings in the neck. The jar is divided into three compartments, by as many rustic handles of knotted oak; while branches of the same tree, with their rich foliage rising from the plinth, are spread tastefully over the lions' paws, and thence entwining with the handles, rise and encircle the base of the neck. The ornaments of the cover are in keeping with those of the jar, it being covered with branches and foliage of the oak: the whole is surmounted by the figure of the rhinoceros. The three compartments into which the jar is divided are enriched with highly finished paintings in enamel colours, executed by one of the proprietors of the works, from designs by Stothard, the subjects of which are drawn from the admirable romance of Cervantes. The circular projections at the base, and the cover, are adorned with paintings from nature, of six subjects of rare botanical plants, the originals of which are in the conservatories of Wentworth Castle. The whole is relieved and enlivened by ornamental work, in burnished and chased gold; and the work, both in its design and execution, is highly honorable to the artists.

Up to a comparatively recent period, the manufacture of earthen wares formed one of the very few branches of domestic industry which were left free from the evil effects of direct taxation, and, except in one branch of very minor importance, the art is still in the enjoyment of this immunity; to which favorable circumstance may be imputed much of the signal and uniform success whereby it has been attended. In the year 1812, when the duty upon glass bottles was doubled, the manufacturers of these represented to the chancellor of the exchequer, that unless a countervailing tax was levied upon stone bottles, the latter, being wholly unburthened, would possess an unfair advantage, and might be sold at prices that would drive glass bottles out of use. This was a line of argument in no wise unpalatable to the minister, who readily caught at the suggestion of a new object for taxation; and a duty of five shillings on each hundred weight, was immediately imposed upon all stone bottles the contents of which should be two quarts and under.

The levying of this duty calls for the attendance of revenue officers at all hours on the premises of every stone ware manufacturer throughout the kingdom; and it is very much to be doubted whether, in any one year since its first imposition, the expenses of collection have not more than absorbed the whole amount paid by the potters. The total quantity of stone ware made, which is chargeable with the duty does not exceed 600 tons annually, and a large proportion of this is used for purposes to which glass has never been applied. It is not very likely that stone ware, the utility of which for many purposes is exceedingly great, would ever have been brought into competition with a material so much lighter, and in many respects so much more convenient, even had the pottery continued free from the domiciliary visits of the exciseman; and now that the experiment has been fairly tried during nearly twenty years, and has been found unproductive of any real revenue, there can be no sufficient reason for continuing the impost.

From Percy Anecdotes.

DEAF AND DUMB PAINTER.

JUAN FERNANDEZ XIMENES, commonly called El Mudo, or the Dumb, was from his infancy both deaf and dumb; but affording sufficient tokens of an earnest desire to learn the art of painting, he was placed under good masters; and from the excellence which he attained, he was called the Spanish Titian. He was one of the painters of the Escurial, and his principal work was the representation of the four Evangelists, which he painted in fresco.

One of the paintings which he made for a chapel that King Philip erected in the wood of Segovia, represents the beheading of Santiago; and El Mudo inserted the portrait of Santoyo as the executioner, in revenge for some ill offices which that minister had done him. Santoyo complained to the king, begging that the figure might be expunged, and his person not delivered to posterity in the disgraceful occupation of a hangman. The king, who probably knew the cause of the offence, did not disapprove of the nature of the revenge, and excusing himself to Santoyo on account of the excellence of the performance, would not allow the picture to be defaced.

When Titian's famous painting of the Last Supper arrived at the Escurial, the king, Philip II. proposed to cut the canvass to the size of the pannel in the refectory, where it was designed to hang. El Mudo, who was present, to prevent the mutilation of so capital a work, made earnest signs of intercession with the king, to be permitted to copy it, and reduce it to the size of the place assigned for it, offering to do it in the space of six months. The king expressed some hesitation on account of the length of time required for the work, and was proceeding to put his design in execution, when El Mudo repeated his supplications in behalf of his favorite master with more fervency than ever, offering to complete the copy in less time than he at first demanded, tendering at the same time his head as the punishment if he failed. The offer was not accepted, and execution was performed upon Titian, accompanied with the most distressing attitudes and distortions of El Mudo.

TITIAN.

SIR Joshua Reynolds valued Titian so highly that he used to say, he would be content to ruin himself to possess one genuine production of his pencil. Titian devoted no less than eighty years of his patriarchal term of life to the prosecution of the art. He was but ten years of age when he became a scholar of Bellini, of whose style he was soon able to present imitations, which excited universal astonishment. Happening afterwards to see the works of Bellini's pupil, Giorgione, he found that he had been excelling in the imitation of a very inferior model; and for some time made it a rule to copy after the elegant but gaudy style of Giorgione. At length, abandoning the trammels of example altogether, he gave himself up to the study of nature alone, and thus arrived at that pitch of perfection which has procured him so enviable an immortality.

WOOD ENGRAVING.

THE first engraving on wood of which there is any record in Europe, is that of 'the Actions of Alexander,' by the two Cunios, executed in 1285 or 1286. The engravings are eight in number, and in size about nine inches by six. In a frontis-piece decorated with fanciful ornaments, there is an inscription which states the engravings to have been by 'Alesandro Alberico Cunio Cavaliere, and Isabella Cunio, twin brother and sister; first reduced, imagined, and attempted to be executed in relief, with a small knife on blocks of wood, made even and polished by this learned and dear sister; continued and finished by us together at Ravenna, from the eight pictures of our invention, painted six times larger than here represented; engraved, explained by verses, and thus marked upon the paper to perpetuate the number of them, and to enable us to present them to our relations and friends in testimony of gratitude, friendship and affection. All this was done and finished by us when only sixteen years of age.' This account, which was given by Papillon, who saw the engravings, has been much disputed; but Mr. Ottley, in his late valuable work, deems it authentic.

From the London Literary Gazette.

PUBLIC LIBRARIES OF EUROPE.

WE are unable to state the exact number of these useful establishments, though on a superficial enumeration, they cannot amount to fewer than between seven and eight hundred; the contents of which have been estimated by Malthus at 19,847,000 volumes. Of these contents there are preserved in

The Austrian States,	2,220,000 vols.
Prussian,	997,000
Remaining States of Germany,	2,524,500
The whole of Germany,	6,651,500
France,	6,427,000
Great Britain,	1,533,000
Russian Empire,	880,000
Italy,	2,139,000

The six most considerable, and at the same time most valuable libraries in Europe, are the following:

	VOLS.	MSS.
Royal Library, Paris,	450,000	76,000
Bodleian, Oxford,	420,000	30,000
Royal Central, Monich,	400,000	9,000
Vatican, Rome,	100,000	40,000
University, Gottingen,	300,000	5,000
British Museum, London,	300,000	

GEOLOGY OF TENNESSEE.

Dr. G. Troost, who was some time ago appointed geologist of Tennessee, by the Legislature of that State, has made a report in part of scientific surveys made in the county of Davidson. Having been read before the House of Representatives, it is to be published in a suitable form, with engraved maps and illustrations. When the whole work for the State shall have been completed in the same manner, a mass of information, scientific and practical, will be embodied, to which it is said no other State can present a parallel.

QUESTIONS ON LYCEUM No. 10.

Where and when did Archimedes live?

Against what enemy did he defend his native city?

Which of the sciences did he improve?

By what process did he determine the alloy in coins?

Which cities furnish the most famous works of art, those of Europe, or those of Asia and Africa?

In what part of the world is lake Mœris?

Who in England has distinguished himself in the cause of education?

Does Henry Brougham advise the laboring classes to look to the learned for instruction, or to procure it by their own efforts?

By whom are the tables of the meteorology of Savannah (Ga.) kept?

What was the mean temperature of Savannah during the month of July last?

How many days in July last were rainy in Savannah?

What is the mean temperature of the equator? also of the poles?

Which month in the year is coldest in all north latitudes? and which is warmest?

Does the temperature of places become higher or lower as their elevation above the sea increases?

At what point above the sea does water freeze every day in the year at the equator?

Are the upper strata of the atmosphere warmer than the lower during any portion of the year?

Which latitudes of the same height have been supposed to be coldest, the northern or southern?

Which places of the same latitude are coldest, islands or the continent?

How many changes can be recognized in the apple, as produced by fermentation?

What substance is formed in the apple after it is made into pumice, and before it becomes cider, or contains alcohol?

In the formation of vinegar, what substance is destroyed?

What is that stage of fermentation called which produces alcohol and destroys sugar?

What are the proofs that alcohol contains no nutriment?

Is there reason to believe that on the first of March fuel will be higher or lower than at present?

How many substances are used in China in the manufacture of porcelain?

What chemist went into an examination of these substances?

Who gives an account of the porcelain deposited in the Chinese palace at Dresden?

In what part of England did the Romans establish potteries?

In what county in England is porcelain now manufactured in large quantities?

What substance is used in glazing porcelain?

Who has made greater improvements than any other man in the manufacture of articles from the earths?

Which was the most important of Mr. Wedgwood's inventions?

What are some of the different kinds of ware made by Mr. Wedgwood?

What were the advantages of his early education, good or poor?

What is meant by the word gem?

Which is the most precious of the gems?

Of what is the diamond composed?

How is the value of a diamond estimated?

Who has the largest diamond in the world?

What other diamonds are there of great value?

What is the value of the diamond belonging to the emperor of Russia?

In what manner did this diamond come into the possession of the emperor of Russia?

Is the diamond in the hands of the king of Portugal polished or unpolished, and how many carats does it weigh?